

Catalogue of American Amphibians and Reptiles.

Mendelson, J.R., III. 1998. *Bufo cavifrons*.

***Bufo cavifrons* Firschein**

Bufo cavifrons Firschein 1950:84, pl. 1. Type locality, "500 feet [152 m] below peak of Volcán San Martín, San Andrés Tuxtla, Veracruz [Mexico]." Holotype, University of Illinois Museum of Natural History (UIMNH) 8741, an adult female, collected by I.L. Firschein, 29 August 1947 (examined by author).

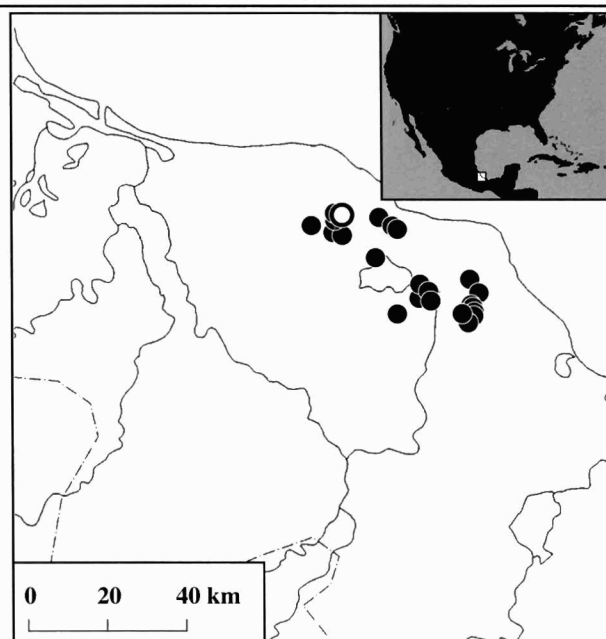
• **Content.** No subspecies are recognized.

• **Definition.** This large species of *Bufo* (male SVL to 79.9 mm, females SVL to 99.8 mm) has the following combination of characters: (1) tympanum small, about 45% diameter of orbit; (2) preorbital crest absent or present only as a thin strip of raised bone in large females, pretympenic crest absent; (3) tibia relatively short, about 40% SVL, robust; (4) foot relatively short, about 40% SVL; (5) skin smooth, with few scattered conical tubercles laterally and posteriorly in some females, scattered clusters of keratin over all dorsal surfaces in breeding individuals; (6) lateral row of flank tubercles usually present only as a continuous raised welt in males, in females present as a series of widely spaced, non-pointed, low tubercles; (7) vocal slits large, bilateral; (8) *m. interhyoideus* forming a small, unilobed, unpigmented sac; (9) snout acutely pointed in dorsal and lateral views; (10) cranial crests high and thick, vertically prominent parietal crests form rounded knobs in both sexes, sometimes larger in females; (11) parotoid glands relatively small, not protuberant, usually conspicuously triangular; and (12) color of tips of digits paler than rest of digits.

• **Diagnosis.** *Bufo cavifrons* is most similar to *B. macrocristatus*; however, *B. cavifrons* differs by having smoother skin, smaller and more triangular parotoid glands, smaller tympana relative to the eye, shorter tibia, and larger vocal slits. In some cases, distinguishing some individuals of *B. cavifrons* from some of *B. macrocristatus* may be difficult beyond geography. In such cases the nature of the hypertrophy of the cranial crests is helpful; some female *B. macrocristatus* have raised crests, but they are never so thickened as are those of *B. cavifrons*, and in male



Figure 1. An adult female *Bufo cavifrons* from near the type locality on Volcán San Martín. Photograph by John Werler.



Map. Distribution of *Bufo cavifrons*. The circle indicates the type locality, dots mark other records. Some symbols represent more than one specific locality.

B. macrocristatus the only thickened part of the crests appears as a small knob at the junction of the parietal, supraorbital, and postorbital crests. *Bufo cristatus* also has hypertrophied cranial crests, but differs by having the parietal crest as a swollen ovoid mass that fills the space between the parietal, postorbital, and supratympanic crests, much larger parotoids glands, smaller tympana, and by lacking vocal slits and sac. *Bufo campbelli* is a smaller, more gracile toad with low and thin cranial crests. *Bufo valliceps*, with which *B. cavifrons* may be sympatric near disturbed habitats, has low, non-hypertrophied crests, shorter legs, distinct preorbital and pretympenic crests, a larger tympanum, and the *m. interhyoideus* forming a large, bilobed, pigmented sac.

• **Descriptions.** Detailed descriptions were provided by Firschein (1950) and Mendelson (1997a, c). Porter (1964b, 1966) described the advertisement call and provided an audiospectrogram. Shannon and Werler (1955) briefly described the tadpole. Major characteristics of the tadpole were summarized by Altig and Johnston (1986) and Altig (1987).

• **Illustrations.** Firschein (1950) provided photographs of the holotype and Martin (1972) a photograph of the skull. Mendelson (1997a, c) included a sketch of the dorsal aspect of the head. Porter (1966) included an audiospectrogram of the advertisement call.

• **Distribution.** *Bufo cavifrons* is known only from the Sierra de los Tuxtlas, Veracruz, México, at elevations of about 200–1600 m. Within this relatively small and isolated range, most specimens have been collected from the slopes of Volcán San Martín. However, specimens also are known from the lower slopes of Volcán Santa Marta and several lower elevation localities such as Zapoapan and Tebanca.

• **Fossil Record.** None.

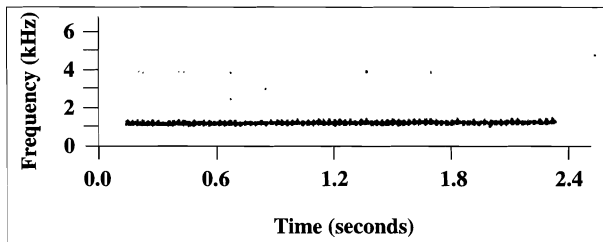


Figure 2. Audiospectrogram of the advertisement call of *Bufo cavifrons* (adapted from Porter 1966). The recording was made in the laboratory (Univ. Michigan, UMMZ tape no. 1098) at an air temperature of 25°C; a voucher specimen was not cited).

• **Pertinent Literature.** Firschein (1950) described the habitat at the type locality. Shannon and Werler (1955) provided observations of breeding activity and a brief description of the tadpole. Porter (1964a) provided a rediagnosis of the species and referred three allopatric populations in southern México to the taxon *Bufo cavifrons*. This taxonomic arrangement was followed until Mendelson (1997a, b, c) restricted the name to the population in the Sierra de los Tuxtlas. Porter (1964b, 1966) described the advertisement call. Blair (1966, 1972b) reviewed the results of hybridization experiments involving *B. cavifrons* and similar species.

This species was mentioned in several studies of the genus *Bufo* (Tihen 1962, Low 1972, Maxson et al. 1981, Mendelson 1994) and included in additional checklists, keys, and regional and taxonomic works by Darling and Smith (1954), Firschein and Smith (1957), Gorham (1963, 1974), Smith and Smith (1976), Pérez-Higareda (1978), Harding (1983), Frost (1985), Flores-Villela et al. (1987, 1995), Pérez-Higadera [sic] et al. (1987), Villa et al. (1988), Flores-Villela (1993), Liner (1994), Ramírez-Bautista and Nieto-Montes de Oca (1997), and Vogt et al. (1997).

• **Nomenclatural History.** Porter (1964a) referred three allopatric montane populations of crested *Bufo* in Veracruz, Oaxaca, and Chiapas, México, to *B. cavifrons*, and suggested that the name may be a junior synonym of *B. cristatus*. Johnson (1989) referred a population from the Sierra de Chimalapas of southeastern Oaxaca to *B. cavifrons*. Mendelson (1997a, b, c) restricted the name *B. cavifrons* to the distinctive toads in the Sierra de los Tuxtlas, and referred the remaining populations to *B. macrocristatus* Firschein and Smith, *B. spiculatus* Mendelson, and *B. tutelarius* Mendelson.

• **Remarks.** The tadpole described and referred to *B. cavifrons* by Korky and Webb (1973) is *B. macrocristatus* (Mendelson 1997a, c). Korky and Webb (1973) also incorrectly referred to Wiegmann, rather than Firschein, as the author of the name *B. cavifrons*.

Porter's (1967) report of *B. cavifrons* in Nicaragua is based on a specimen of *B. valliceps*, and Nicaraguan specimens assigned to *B. cavifrons* by Porter and Porter (1967) also are likely referable to *B. valliceps*.

The report of *B. cavifrons* in Honduras by Meyer and Wilson (1971) is based, at least in part, on specimens of *B. campbelli*.

Firschein (1950) placed *B. cavifrons* in the *B. cristatus* group, but in all other reviews of species groups in *Bufo* (e.g., Blair 1972a), *B. cavifrons* has been included in the *B. valliceps* group; Firschein's (1950) *B. cristatus* group has not been recognized in subsequent literature.

Vogt et al. (1997) suggested that *B. cavifrons* may be but an allometric variant of *B. valliceps*.

• **Etymology.** The specific epithet, *cavifrons*, is derived from the Latin *cavus* (= hollow) and *frons* (brow) in reference to the distinctive hollowed appearance of the top of the head produced by the extreme hypertrophy of the cranial crests.

Literature Cited

- Altig, R. 1987. Key to the anuran tadpoles of Mexico. *Southw. Nat.* 32:75–84.
- and G.F. Johnston. 1986. Major characteristics of free-living anuran tadpoles. *Smithson. Herpetol. Info. Serv.* (67):1–75.
- Blair, W.F. 1966. Genetic compatibility in the *Bufo valliceps* and closely related groups of toads. *Texas J. Sci.* 18:333–351.
- . 1972a. *Bufo* of North and Central America, p. 93–101. In W.F. Blair (ed.), *Evolution of the Genus Bufo*. Univ. Texas Press, Austin.
- . 1972b. Evidence from hybridization, p. 196–232. In W.F. Blair (ed.), *Evolution of the Genus Bufo*. Univ. Texas Press, Austin.
- Darling, D.M. and H.M. Smith. 1954. A collection of reptiles and amphibians from eastern Mexico. *Trans. Kansas Acad. Sci.* 57:180–195.
- Firschein, I.L. 1950. A new toad from Mexico with a redefinition of the *cristatus* group. *Copeia* 1950:81–87.
- and H.M. Smith. 1957. A high crested race of toad (*Bufo valliceps*) and other noteworthy reptiles and amphibians from southern Mexico. *Herpetologica* 13:219–222.
- Flores-Villela, O. 1993. *Herpetofauna Mexicana*. Carnegie Mus. Nat. Hist. Spec. Publ. (17):iv + 73 p.
- , F. Mendoza Quijano, and G. Gonzalez Porter (eds.). 1995. *Recopilación de claves para la determinación de anfibios y reptiles de México*. Univ. Nac. Aut. México Publ. Esp. Mus. Zool. (10):1–285.
- , G. Pérez-Higadera [sic], R.C. Vogt, and M. Palma Muñoz. 1987. Claves para los géneros y las especies de anfibios y reptiles de la región de Los Tuxtlas. Univ. Nac. Aut. México, México, D.F.
- Frost, D.R. (ed.). 1985. *Amphibians Species of the World: A Taxonomic and Geographic Reference*. Allen Press and Assoc. Syst. Coll., Lawrence, Kansas.
- Gorham, S.W. 1963. The comparative number of species of amphibians in Canada and other countries. III. Summary of species of anurans. *Can. Fld. Nat.* 77:13–48.
- . 1974. *Checklist of World Amphibians*. New Brunswick Museum, St. John, New Brunswick.
- Harding, K.A. 1983. *Catalogue of New World Amphibians*. Pergamon Press, New York.
- Johnson, J.D. 1989. A biogeographic analysis of the herpetofauna of northwestern nuclear Central America. *Milwaukee Pub. Mus. Contr. Biol. Geol.* (76):1–66.
- Korky, J. and R.G. Webb. 1973. The larva of the Mexican toad *Bufo cavifrons* Wiegmann. *J. Herpetol.* 7:47–49.
- Liner, E.A. 1994. Scientific and common names for the amphibians and reptiles of Mexico in English and Spanish. *Nombres científicos y comunes en inglés y español de los anfibios y los reptiles de México*. Soc. Study Amph. Rept. Herpetol. Circ. (23):v + 113 p.
- Low, B.S. 1972. Evidence from parotoid secretions, p. 244–264. In W.F. Blair (ed.), *Evolution of the Genus Bufo*. Univ. Texas Press, Austin.
- Martin, R.F. 1972. Evidence from osteology, p. 37–70. In W.F. Blair (ed.), *Evolution of the Genus Bufo*. Univ. Texas Press, Austin.
- Maxson, L.R., A.-R. Song, and R. Lopata. 1981. Phylogenetic relationships among North American toads, genus *Bufo*. *Biochem. Syst. Ecol.* 9:347–350.

- Mendelson, J.R., III. 1994. A new species of toad (Anura: Bufonidae) from the lowlands of eastern Guatemala. *Occ. Pap. Mus. Nat. Hist. Univ. Kansas* (166):1–21.
- . 1997a. The Systematics of the *Bufo valliceps* Group (Anura: Bufonidae) of Middle America. Ph.D. Diss., Univ. Kansas, Lawrence.
- . 1997b. A new species of toad (Anura: Bufonidae) from the Pacific highlands of Guatemala and southern Mexico, with comments on the status of *Bufo valliceps macrocristatus*. *Herpetologica* 53:14–30.
- . 1997c. A new species of toad (Anura: Bufonidae) from Oaxaca, Mexico, with comments on the status of *Bufo cavi-frons* and *Bufo cristatus*. *Herpetologica* 53:268–286.
- Meyer, J.R. and L.D. Wilson. 1971. A distributional checklist of the amphibians of Honduras. *Contr. Sci. Los Angeles Co. Mus.* (218):1–47.
- Pérez-Higadera [sic] (= Higareda), G., R.C. Vogt, and O.A. Flores Villela. 1987. Lista anotada de los anfibios y reptiles de la región de los Tuxtlas, Veracruz. Estación "Los Tuxtlas," Univ. Nac. Aut. México, México, D.F.
- Pérez-Higareda, G. 1978. Reptiles and amphibians from the Estación de Biología Tropical "Los Tuxtlas" (UNAM), Veracruz, Mexico. *Bull. Maryland Herpetol. Soc.* 14:67–74.
- Porter, K.R. 1964a. Distribution and taxonomic status of seven species of Mexican *Bufo*. *Herpetologica* 19:229–247.
- . 1964b. Morphological and mating call comparisons in the *Bufo valliceps* complex. *Amer. Midl. Nat.* 71:232–245.
- . 1966. Mating calls of six Mexican and Central American toads (genus *Bufo*). *Herpetologica* 22:60–67.
- . 1967. *Bufo cavi-frons* Firschein collected in Nicaragua. *Herpetologica* 23:66.
- and W.F. Porter. 1967. Venom comparisons and relationships of twenty species of New World toads (genus *Bufo*). *Copeia* 1967:298–307.
- Ramírez-Bautista, A. and A. Nieto-Montes de Oca. 1997. Eco-geografía de anfibios y reptiles, p. 523–532. *In* E. González-Soriano, R. Dirzo, and R.C. Vogt (eds.), *Historia Natural de Los Tuxtlas*. Univ. Nac. Auto. México, México.
- Shannon, F.A. and J.W. Werler. 1955. Notes on amphibians of the Los Tuxtlas range of Veracruz, Mexico. *Trans. Kansas Acad. Sci.* 58:360–386.
- Smith, H.M. and R.B. Smith. 1976. Synopsis of the Herpetofauna of Mexico. Vol. IV. John Johnson, North Bennington, Vermont.
- Tihen, J.A. 1962. Osteological observations on New World *Bufo*. *Amer. Midl. Nat.* 67:157–183.
- Villa, J., L.D. Wilson, and J.D. Johnson. 1988. Middle American Herpetology: A Bibliographic Checklist. Univ. Missouri Press, Columbia.
- Vogt, R.C., J.L. Villarreal-Benítez, and G. Pérez-Higareda. 1997. Lista anotada de los anfibios y reptiles, p. 507–522. *In* E. González-Soriano, R. Dirzo, and R.C. Vogt (eds.), *Historia Natural de Los Tuxtlas*. Univ. Nac. Auto. México, México.

Joseph R. Mendelson, III, Museum of Natural History and Department of Systematics and Ecology, University of Kansas, Lawrence, KS 66045–2454 (present address: Department of Biology, Utah State University, Logan UT 84322–5305).

Primary editor for this account, John D. Lynch.

Published 30 January 1998 and Copyright © 1998 by the Society for the Study of Amphibians and Reptiles.
